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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Guangwei Wu

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EXAMINER

VINH, LAN

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/575,028	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> LAN VINH	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 5/18/2009 have been fully considered but they are not persuasive.

The applicants argue that, the hardness of the top pad and the hardness of the subpad taught by Tsai et al. cannot be substantially equal because Tsai et al specify the differences between the hardness of the top pad 25 and the subpad by giving different ranges of Shore D hardness of 50 or greater for the top pad and Shore D hardness of less than 50 for the subpad. This argument is unpersuasive because since it is noted that claim 5 recites " the stacked pad comprising a top pad having a shore D hardness from about 40 to about 70" , the teaching of the Shore D hardness of less than about 50 for the subpad, as taught by Tsai, is certainly encompassed by the claimed shore D hardness from about 40 to about 70 of the top pad. Thus, it is maintained that the hardness of the top pad and the hardness of the subpad taught by Tsai et al. is substantially equal as recited in claim 5

The applicants argue that the cited reference of Tsai is silent regarding pad conditionings, as required in claim 12. This argument has been fully considered and is persuasive. Therefore, the rejection of claim 12 under 35 U.S.C 102(a) as being anticipated by Tsai (387) has been withdrawn. However, upon further consideration, a new ground(s) of rejection of claim 12, under 35 U.S.C 103(a), is made in view of Tsai (387) and Robert et al (564)

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The applicants argue that there is no suggestion to combine the references of Tsai and Robert because: Roberts et al. only teach the range of pressures for down force conditioning as being between 0.1 to about 25 pounds per square inch; Nowwhere does Roberts et al. teach or suggest any expectation that low downforce pressures, such as less than 0.24 psi, provide results that would motivate a person of ordinary skill in the art to use such low downforce pressures. This argument is unpersuasive because: Roberts teaches that the range of pressures for down force conditioning is preferably between 0.1 to about 25 pounds per square inch, the preferred end range of 0.1 psi certainly meets the claimed "down force less than about 0.24 psi", as required in claims 6, 7, 8; The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), in this case since Robert discloses conditioning the pad at a pressure of 0.1-25 psi to reform the micro-protrusions on the polishing pad in order to prevent diminishing polishing performance during conditioning (page 5, paragraph 0072), one skilled in the art at the time the invention was made would have found it obvious to incorporate Roberts teaching into Tsai method to produce the claimed inventions as required in claims 6, 7, 8. The rejection(s) of claims 6-11, 13-14 under 35 U.S.C. 103(a) as being unpatentable over

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Tsai et al (US 2003/0013387) in view of Roberts et al (US 2004/0048564) are maintained in this office action

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim 5 is rejected under 35 U.S.C. 102(a) as being anticipated by Tsai et al ( US 2003/0013387)

Tsai discloses a method for planarizing a substrate. The method comprises providing a substrate having a surface for fabricating electronic devices, the surface comprising a dielectric material having a dielectric constant less than two (page 6, paragraph 0057) providing a stacked pad, the stacked pad comprising a hard polishing material/top pad having a Shore D hardness of 50 or greater and a soft polishing material/subpad having a Shore D hardness of less than 50 (page 8, paragraphs 0082-0085), which reads on providing a stacked pad, the stacked pad comprising a top pad having a Shore D hardness from about 40 to about 70 and a subpad having a Shore D hardness substantially equal to the hardness of the top pad since the applicants discloses "More generally, for embodiments of the present invention top pad 20 has Shore D hardness greater than about 30, preferably from about 40 to about 70 and all ranges and values subsumed therein. Similarly, subpad 40 has a preferred Shore D hardness from about

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30 to about 70 and all ranges" (page 5 of the instant application).

contacting the top pad with the surface and planarizing the surface with the stacked pad (page 8, paragraph 0088)

3. Claim 15 is rejected under 35 U.S.C. 102(a) as being anticipated by Tsai et al ( US 2003/0013387)

Tsai discloses a method for planarizing a substrate. The method comprises providing a substrate having a surface for fabricating electronic devices (page 6, paragraph 0057)

providing a stacked pad, the stacked pad comprising a hard polishing material/top pad having a Shore D hardness of 50 or greater and a soft polishing material/subpad having a Shore D hardness of less than 50 (page 8, paragraphs 0082-0085), which reads on providing a stacked pad, the stacked pad comprising a top pad and a subpad, wherein the hardness or modulus of the top pad substantially equals the hardness or modulus of the subpad since the applicants discloses "More generally, for embodiments of the present invention top pad 20 has Shore D hardness greater than about 30, preferably from about 40 to about 70 and all ranges and values subsumed therein. Similarly, subpad 40 has a preferred Shore D hardness from about 30 to about 70 and all ranges" (page 5 of the instant application).

contacting the top pad with the surface and planarizing the surface with the stacked pad (page 8, paragraph 0088)

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-11, 12, 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al (US 2003/0013387) in view of Roberts et al (US 2004/0048564)

Tsai method has been described above. Unlike the instant claimed inventions as per claims 6-10, 12, 14, Tsai fails to specifically disclose: a step of conditioning the top pad using a down force less than about 0.24 psi (1.7 KPa) after planarization of a plurality of the substrates ( 5 substrates)/repeating the polishing steps, processing a plurality of wafers between pad conditioning, the stacked pad is conditioned on a tool other than a polishing tool

Robert discloses a method for polishing comprises a step of conditioning a polishing pad using a down force of 0.1-25 psi after planarization of a plurality of wafers, the pad is conditioned with a disk/a tool other than a polishing tool, processing a plurality of wafers between pad conditioning ( page 5, paragraphs 0072- 0074, page 6, paragraph 0083)

One skilled in the art at the time the invention was made would have found it obvious to modify Tsai method to include a step of conditioning a polishing pad using a down force of 0.1 psi after planarization of a plurality of wafers as per Robert to reform the micro-protrusions on the polishing pad in order to prevent diminishing polishing performance

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(page 5, paragraph 0072) and to extend the life of the polishing pad.

Unlike the instant claimed inventions as per claims 11, 13, Tsai fails to disclose conditioning the top pad only prior to the first planarization. Robert also teaches that pad are generally conditioned prior to use (page 3, paragraph 0029). Ones skilled in the art at the time the invention was made would have also found it obvious to modify Tsai method to include a step of conditioning the top pad only prior to the first planarization to create or augment the micro texture of the pad as taught per Robert (paragraph 0029)

5. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al (US 2003/0013387) in view of Chen et al (US 6,712,681 )

Tsai method has been described above. Unlike the instant claimed inventions as per claims 17-18, 19, Tsai fails to specifically disclose that the top pad and subpad have a substantially equal density and the density is in the range from about 0.5 to about 0.7 grams/cc/the top pad and subpad have a substantially equal pore size range and the pore size range is in the range from about 0.5 to about 0.7 grams/cc

Chen discloses a method for fabricating polishing pad, the pad having multiple layer, having density of about 0.5 g/c, the pad also have pore sizes (col 5, lines 20-38; col 6, lines 18-21)

One skilled in the art at the time the invention was made would have found it obvious to modify Tsai method by using a top pad and subpad have a substantially equal density and the density is in the range from about 0.5/a top pad and subpad have a



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substantially equal pore size range to ensure the desired hardness and uniform porosity of the pad in order to achieve better polishing uniformity as taught in Chen (col 5, lines 20-27)

Regarding claim 16, since Tsai discloses that hard polishing material/top pad having a Shore D hardness of 50 or greater and a soft polishing material/subpad having a Shore D hardness of less than 50, one skilled in the art at the time the invention was made would have found it obvious to compute/to optimize the value of the compressibility/ratio of hardness of the top pad and subpad by varying the hardness values of the top pad and subpad through routine experimentation

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is (571)272-1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lan Vinh/  
Primary Examiner, Art Unit 1792